REMARKS

Claims 1-46 are pending in this application. Claims 1, 10, 20, 21, 30, 34 and 43 are independent claims. Claims 5, 7, 8, 11, 22-29, 31-33 and 36-46 are amended. Reconsideration and allowance of the present application are respectfully requested.

Claim Objections

Claim 7 is objected to because of informalities. In view of the amendment to claim 7, this objection is now moot. Therefore, Applicant respectfully requests that the objections to claim 7 be withdrawn.

Rejections under 35 U.S.C. §102

Claims 21, 22, 25, 29, 30, 33-35, 38 and 42 stand rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 7,103,325 to Jia et al. (hereinafter "Jia"). This rejection is respectfully traversed.

Claim 21, upon which claims 22-29 depend, recites "an apparatus comprising: a multi-antenna signal processing circuit; a baseband processor capable of operating substantially simultaneously with the multi-antenna signal processing circuit, the first baseband processor capable of handling data transmissions in a first mode; and the multi-antenna signal processor capable of handling data transmissions in a second mode."

Claim 30, upon which claims 31-33 depend, recites "a multi-antenna access point circuit comprising: a baseband processor circuit capable of handling data transmissions during a first operating mode in a channel between a first access point and a second access point; and a multi-antenna signal processing circuit capable of handling data transmissions during a second operating mode in said channel."

Claim 34, upon which claims 35-42 depend, recites "a communication system comprising: a multi-antenna signal processing circuit; a first baseband processor capable of operating substantially simultaneously with the multi-antenna signal processing circuit, the first baseband processor capable of handling data transmissions in a first mode; and the multi-antenna signal processor capable of handling data transmissions in a second mode."

As outlined below, Jia does not teach or suggest each of the elements of claims 21, 22, 25, 29, 30, 33-35, 38 and 42.

Jia discloses the selection of a space-time encoding mode for use when transmitting with spatial diversity based on the receive diversity associated with a receiver device and the quality of the transmission channels based on information fed back from the receiver device. The selectable space-time encoding modes are preferably space-time transmit diversity encoding and a version of BLAST-type encoding. During operation, the transmitter continuously monitors the quality of channel conditions, and based on the diversity of the receiver device, will dynamically select the space-time encoding mode, modulation mode, and error correction encoding most appropriate for current conditions. The space-time encoding mode selection is applicable in a wide variety of wireless communication environments in both uplink and downlink modes. As such, both base stations and mobile terminals can take advantage of the adaptive modulation and coding. See at least Col. 2, lines 32-61 of Jia.

Applicant submits that Jia does not teach or suggest each of the elements recited in claims 21, 22, 25, 29, 30, 33-35, 38 and 42. Each of claims 21, 22, 25, 29, 30, 33-35, 38 and 42, in part, recites a baseband processor circuit capable of handling data transmissions during a first operating mode and a multi-antenna signal processing circuit capable of handling data transmissions during a second operating mode. Jia does not teach or suggest these features.

As noted above, Jia discloses dynamically selecting one space-time encoding mode. The Office Action alleged that the base station of Jia "generally includes a control system, a baseband processor, transmit circuitry, receive circuitry, multiple antennas, reading on the claimed "multi-antenna signal processing unit," and a network interface." See page 3 of the Office Action. Even if one skilled in the art were to equate the multi-antenna signal processing unit of Jia with the multi-antenna signal processing cited of the pending claims, there is no teaching or suggestion in Jia of the multi-antenna signal processing circuit that is capable handling data transmissions during a second operating mode while the baseband processor circuit is simultaneously capable of handling data transmissions during a first operating mode. Jia merely discloses selecting one mode at a time. Jia does not teach or suggest handing data transmissions in more than one mode. While Jia does disclose that there are a plurality of space-time encoding modes to choose from, only one mode is chosen for data transmission in Jia. Therefore,

Applicant submits that Jia does not teach or suggest each of the elements of claims 21, 22, 25, 29, 30, 33-35, 38 and 42 and respectfully requests that this rejection of claims 21, 22, 25, 29, 30, 33-35, 38 and 42 under 35 U.S.C. §102 be withdrawn.

Rejections Under 35 U.S.C. § 103

Claims 1-5, 8, 9, 23, 24, 31, 32, 36 and 37 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Jia in view of U.S. Patent Publication No. 2004/0082356 to Walton et al." (hereinafter "Walton"). This rejection is respectfully traversed.

Claim 1, upon which claims 2-9 depend, recites "a radio frequency (RF) multi-antenna access point enhancement circuit comprising: a multi-antenna signal processing circuit situated in a first access point and adapted to: (a) operate simultaneously with a first baseband processor, so that said first baseband processor handles data transmissions in a first mode between said first access point and a second access point under a first channel transmission condition, and said multi-antenna signal processor handles data transmissions in a second mode between said first access point and said second access point under a second channel transmission condition; (b) receive M independent RF modulated input signals from said second access point when the second channel transmission mode exists between the first access point and said second access point; (c) process said M independent RF modulated input signals using a channel mixing matrix to extract N independent data signals transmitted by said second access point; wherein said multi-antenna signal processing circuit operates selectively with a first baseband processor to demodulate RF signals received in a channel from a second access point."

As noted below, the combination of Jia and Walton does not teach or suggest each of the elements of claims 1-5, 8, 9, 23, 24, 31, 32, 36 and 37.

Walton discloses a multiple-access MIMO WLAN system that employs MIMO, OFDM, and TDD. The system (1) uses a channel structure with a number of configurable transport channels, (2) a baseband processor circuit capable of handling data transmissions during a first operating mode and a multi-antenna signal processing circuit capable of handling data transmissions during a second operating mode, which are configurable based on channel conditions and user terminal capabilities, (3) employs a pilot structure with several types of pilot (e.g., beacon, MIMO, steered reference, and carrier pilots) for different functions, (4)

implements rate, timing, and power control loops for proper system operation, and (5) employs random access for system access by the user terminals, fast acknowledgment, and quick resource assignments. Calibration may be performed to account for differences in the frequency responses of transmit/receive chains at the access point and user terminals. The spatial processing may then be simplified by taking advantage of the reciprocal nature of the downlink and uplink and the calibration. See at least the Abstract of Walton.

Applicant submits that the combination of Jia and Walton does not teach or suggest the combination of elements recited in claims 1-5, 8, 9, 23, 24, 31, 32, 36 and 37.

As noted above, Jia does not teach or suggest "a first access point and adapted to: (a) operate simultaneously with a first baseband processor, so that said first baseband processor handles data transmissions in a first mode between said first access point and a second access point under a first channel transmission condition, and said multi-antenna signal processor handles data transmissions in a second mode between said first access point and said second access point under a second channel transmission condition," as recited in claims 1-9. Jia also does not teach or suggest a baseband processor circuit capable of handling data transmissions during a first operating mode and a multi-antenna signal processing circuit capable of handling data transmissions during a second operating mode, as recited in claims 23, 34, 31, 32, 36 and 37.

Walton does not cure the deficiencies of Jia. While Walton, like Jia, discloses multiple transmission modes, there is no teaching or suggestion in Walton of a baseband processor circuit capable of handling data transmissions during a first operating mode and a multi-antenna signal processing circuit that is simultaneously capable of handling data transmissions during a second operating mode, as recited in claims 1-5, 8, 9, 23, 24, 31, 32, 36 and 37. Therefore, Applicant respectfully requests that this rejection of claims 1-5, 8, 9, 23, 24, 31, 32, 36 and 37 under 35 U.S.C. §103 be withdrawn.

Claims 6, 10, 17 and 18 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Jia et al. in view of Walton et al., and in further view of U.S. Patent No. 7,126,926 to Bjorklund et al. (hereinafter "Bjorklund"). This rejection is respectfully traversed.

Claim 10, upon which claims 11-19 depend, recites "an 802.11x compatible radio frequency (RF) multi-antenna access point enhancement circuit comprising: a multi-antenna signal processing circuit situated in a first access point and adapted to: (a) operate simultaneously with a first baseband processor, so that said first baseband processor handles data transmissions in a first mode between said first access point in accordance with an 802.11x protocol, and a second access point under a first channel transmission condition, and said multi-antenna signal processor handles data transmissions in a second mode between said first access point and said second access point in accordance with an 802.11x protocol under a second channel transmission condition; (b) receive M independent RF modulated input signals from said second access point when the second channel transmission mode exists between the first access point and said second access point; (c) process said M independent RF modulated input signals using a channel mixing matrix to extract N independent data signals transmitted by said second access point; (d) transmit an RF modulated signal to said second access point using a point coordination function (PCF) mode associated with said 802.11x protocol so as to maintain timing compatibility; wherein said multi-antenna signal processing circuit operates with a first baseband processor to receive and transmit RF signals in a channel between said first access point and said second access point."

As outlined below, the combination of Bjorklund, Jia and Walton does not teach or suggest each of the elements of claims 6, 10, 17 and 18.

Bjorklund discloses a multi-tier system for digital radio communication. The multi-tier system has a first-tier base station with relatively long-range radio and has a second-tier base station with relatively short-range, low power and cheaper radios. The system can be configured to meet demands of various applications. The application may include data capture using bar code readers, radio frequency readers and other automatic data capture devices. See at least the Abstract of Bjorklund.

Applicant submits that the combination of Bjorklund, Jia and Walton does not teach or suggest each of the elements of claims 6, 10, 17 and 18. Bjorklund also does not cure the deficiencies of Jia and Walton, as outlined above. Specifically, Bjorklind also does not teach or suggest "a first access point and adapted to: (a) operate simultaneously with a first baseband processor, so that said first baseband processor handles data transmissions in a first mode between said first access point and a second access point under a first channel transmission

condition, and said multi-antenna signal processor handles data transmissions in a second mode between said first access point and said second access point under a second channel transmission condition," as recited in claims 6, 10, 17 and 18. Therefore, Applicant respectfully requests that this rejection of claims 6, 10, 17 and 18 under 35 U.S.C. §103 be withdrawn.

Claim 7 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Jia in view of Walton, and in further view of U.S. Patent No. 7,006,464 to Gopalakrishnan et al. (hereinafter "Gopalakrishnan"). This rejection is respectfully traversed.

Golpalakrishnan does not cure the deficiencies of Jia and Walton, as noted above with respect to claim 1, upon which claim 7 depends. Specifically, Golpalakrishnan does not teach or suggest "a first access point and adapted to: (a) operate simultaneously with a first baseband processor, so that said first baseband processor handles data transmissions in a first mode between said first access point and a second access point under a first channel transmission condition, and said multi-antenna signal processor handles data transmissions in a second mode between said first access point and said second access point under a second channel transmission condition," as recited in claim 7. Therefore, Applicant respectfully requests that this rejection of claim 7 under 35 U.S.C. §103 be withdrawn.

Claims 11-13 stand rejected under 35 U.S.C. §103(a) as being unpatentable over the combination of Jia and Walton, in view of Bjorklund, and in further view of U.S. Patent No. 7,046,651 to Terry ("hereinafter Terry"). Claims 14-16 and 19 stand rejected under 35 U.S.C. §103(a) as being unpatentable over the combination of Jia and Walton, in view of Bjorklund, and in further view of U.S. Patent Publication No. 2004/0219937 to Sugar et al. (hereinafter "Sugar"). These rejections are respectfully traversed.

Sugar and Terry do not cure the deficiencies of Jia, Walton and Bjorklund, as noted above with respect to claim 10, upon which claims 11-16 and 19 depend. Specifically, neither Sugar nor Terry, whether taken singly or combined, teaches or suggests "a first access point and adapted to: (a) operate simultaneously with a first baseband processor, so that said first baseband processor handles data transmissions in a first mode between said first access point and a second access point under a first channel transmission condition, and said multi-antenna signal processor

handles data transmissions in a second mode between said first access point and said second access point under a second channel transmission condition," as recited in claims 11-16 and 19. Therefore, Applicant respectfully requests that the rejections of claims 11-16 and 19 under 35 U.S.C. §103 be withdrawn.

Claim 20 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Jia in view of Walton, and in further view of Sugar. This rejection is respectfully traversed.

Claim 20 recites "a radio frequency (RF) multi-antenna access point circuit comprising: a baseband processor circuit for handling data transmissions during a first operating mode in a channel between a first access point and a second access point; a multi-antenna signal processing circuit for handling data transmissions during a second operating mode in said channel, said multi-antenna signal processing circuit being further adapted to: (a) receive M independent RF modulated input signals from said second access point; (b) process said M independent RF modulated input signals using a channel mixing matrix to extract N independent data signals transmitted by said second access point; wherein said first operating mode and said second operating mode are automatically selected by the RF multi-antenna access point system based on a transmission condition in said channel; a modulator/demodulator circuit coupled to an antenna assembly and said multi-antenna signal processing circuit and baseband processor circuit for extracting I/Q data samples from an RF modulated received signal; a media access controller coupled to said multi-antenna signal processing circuit and baseband processor circuit for interfacing to a host computing system."

As noted above, none of the cited references teaches or suggests "a radio frequency (RF) multi-antenna access point circuit comprising: a baseband processor circuit for handling data transmissions during a first operating mode in a channel between a first access point and a second access point; a multi-antenna signal processing circuit for handling data transmissions during a second operating mode in said channel," as recited in claim 20. Therefore, Applicant respectfully requests that this rejection of claim 20 under 35 U.S.C. §103 be withdrawn.

Claims 26, 27, 39 and 40 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Jia in view of Bjorklund. Claims 28 and 41 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Jia in view of Terry. These rejections are respectfully traversed.

As noted above, neither Jia and Bjorklund or Jia and Terry teach or suggest a baseband processor circuit capable of handling data transmissions during a first operating mode and a multi-antenna signal processing circuit capable of handling data transmissions during a second operating mode, as recited in claims 26, 27, 28, 39 and 40-41.

Therefore, Applicant respectfully requests that the rejections of claims 26, 27, 28, 39 and 40-41 under 35 U.S.C. §103 be withdrawn.

Claims 43 and 46 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Jia in view of Sugar. Claims 44 and 45 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Jia in view of Sugar, and further in view of Walton. These rejections are respectfully traversed.

Claim 43, upon which claims 44-46 depend, recites "a communication system comprising: a media access controller; a baseband processor circuit coupled to said media access controller, said baseband processor being capable of handling data transmissions during a first operating mode in a channel between the first access point and the second access point; and a multi-antenna signal processing circuit capable of handling data transmissions during a second operating mode in said channel."

As previously noted, neither Jia, Sugar nor Walton, whether taken singly or combined, teaches or suggests " a baseband processor circuit coupled to said media access controller, said baseband processor being capable of handling data transmissions during a first operating mode in a channel between the first access point and the second access point; and a multi-antenna signal processing circuit capable of handling data transmissions during a second operating mode in said channel." Therefore, Applicant respectfully requests that this rejection of claims 43 and 46 under 35 U.S.C. §103 be withdrawn.

Disclaimer

Applicant may not have presented all possible arguments or have refuted the characterizations of either the claims or the prior art as found in the Office Action. However, the lack of such arguments or refutations is not intended to act as a waiver of such arguments or as concurrence with such characterizations.

CONCLUSION

In view of the above, consideration and allowance are respectfully solicited.

In the event the Examiner believes an interview might serve in any way to advance the prosecution of this application, the undersigned is available at the telephone number noted below.

The Office is authorized to charge any necessary fees to Deposit Account No. 22-0185.

Applicant believes no fee is due with this response other than any fee that may be indicated on an accompanying paper. However, if a fee is due, please charge our Deposit Account No. 22-0185, under Order No. 27592-00275-US6 from which the undersigned is authorized to draw.

Dated: May 27, 2008

Respectfully submitted,

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